

WHAT IS CLAIMED IS:

1. A scanning lens for an optical scanner, comprising a curved surface and having a specific adjusting axis, wherein  
the specific adjusting axis is a rotating center of the scanning  
5 lens and center of the curved surface,  
the scanning lens is disposed on a holding member in such a manner that the curved surface is in contact with a receiving surface of the holding member, and  
a position of the scanning lens is adjusted by a rotating  
10 mechanism that rotates the scanning lens.
2. The scanning lens according to claim 1, wherein the scanning lens has a power in a sub-scanning direction, taking the specific adjusting axis as an optical axis.
- 15 3. An optical scanner comprising:  
a scanning lens having a curved surface centering around an optical axis;  
a scanning lens holding member that holds the scanning lens,  
20 having a receiving surface that supports the curved surface; and  
an adjustment member that rotates the scanning lens, with the optical axis as a rotating center, to adjust a position of the scanning lens.

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4. The optical scanner according to claim 3, wherein the adjustment member is disposed at a symmetrical position across the receiving surface.

5 5. An optical scanner comprising:

a scanning lens that is disposed in a main scanning direction as a longitudinal direction, and that transmits light from a light source;

a scanning lens holding member that holds the scanning lens so that the scanning lens is movable in a sub-scanning direction; and

10 an adjustment unit including

two eccentric members that are disposed on both ends of the scanning lens, and rotate centering around each of supporting axes that are perpendicular to both the main scanning direction and the sub-scanning direction, respectively; and

15 an eccentric amount adjustment unit that respectively adjusts eccentric amounts of the eccentric members, wherein

outer surfaces of each of the eccentric members make a contact with the both ends of the scanning lens, respectively, and

both ends of the scanning lens are displaced in a sub-scanning  
20 direction based on the eccentric amounts that change with a rotation of the eccentric members.

6. An optical scanner comprising:

a scanning lens that is disposed in a main scanning direction as  
25 a longitudinal direction, and that transmits light from a light source;

a scanning lens holding member that holds the scanning lens so that the scanning lens is movable in a sub-scanning direction; and

an adjustment unit that is disposed on each of longitudinal ends of the scanning lens, and that displaces the longitudinal ends in the

5 sub-scanning direction, wherein

the adjustment unit is provided with an actuator that is driven electrically.

7. An image forming apparatus comprising:

10 an optical scanner including

a scanning lens having a curved surface centering around an optical axis;

a scanning lens holding member that holds the scanning lens; having a receiving surface that supports the curved surface; and

15 an adjustment member that rotates the scanning lens, with the optical axis as a rotating center, to adjust a position of the scanning lens.

8. The image forming apparatus according to claim 7, further

20 comprising:

a detecting unit that detects a toner mark on a belt; and

a driving unit that drives the adjustment member based on a result of the detection.

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9. An image forming apparatus comprising:  
an optical scanner including  
a scanning lens that is disposed in a main scanning  
direction as a longitudinal direction, and that transmits light from a light  
5 source;  
a scanning lens holding member that holds the scanning  
lens so that the scanning lens is movable in a sub-scanning direction;  
and  
an adjustment unit including  
10 two eccentric members that are disposed on both  
ends of the scanning lens, and rotate centering around each of  
supporting axes that are perpendicular to both the main scanning  
direction and the sub-scanning direction, respectively; and  
an eccentric amount adjustment unit that  
15 respectively adjusts eccentric amounts of the eccentric members,  
wherein  
outer surfaces of each of the eccentric members make a  
contact with the both ends of the scanning lens, respectively, and  
both ends of the scanning lens are displaced in a  
20 sub-scanning direction based on the eccentric amounts that change  
with a rotation of the eccentric members.

10. The image forming apparatus according to claim 9, further  
comprising:  
25 a detecting unit that detects a toner mark on a belt; and

a driving unit that drives the adjustment member based on a result of the detection.

11. An optical scanner comprising:

5 an optical scanner including

a scanning lens that is disposed in a main scanning direction as a longitudinal direction, and that transmits light from a light source;

a scanning lens holding member that holds the scanning  
10 lens so that the scanning lens is movable in a sub-scanning direction; and

an adjustment unit that is disposed on each of longitudinal ends of the scanning lens, and that displaces the longitudinal ends in the sub-scanning direction, wherein

15 the adjustment unit is provided with an actuator that is driven electrically.

12. The image forming apparatus according to claim 11, further comprising:

20 a detecting unit that detects a toner mark on a belt; and

a driving unit that drives the adjustment member based on a result of the detection.

13. A color image forming apparatus comprising:

25 an optical scanner including

a scanning lens having a curved surface centering  
around an optical axis;

a scanning lens holding member that holds the scanning  
lens, having a receiving surface that supports the curved surface; and

5 an adjustment member that rotates the scanning lens,  
with the optical axis as a rotating center, to adjust a position of the  
scanning lens; and

N image carriers on each of which a latent image is formed,  
wherein

10 the optical scanner has N optical paths so that the latent image  
is formed on each of the N image carriers through the N optical paths,  
and

the adjustment member is disposed on each of N-1 optical paths  
among the N optical paths.

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14. A color image forming apparatus comprising:

an optical scanner including

a scanning lens that is disposed in a main scanning  
direction as a longitudinal direction, and that transmits light from a light  
20 source;

a scanning lens holding member that holds the scanning  
lens so that the scanning lens is movable in a sub-scanning direction;  
and

an adjustment unit including

25 two eccentric members that are disposed on both

ends of the scanning lens, and rotate centering around each of supporting axes that are perpendicular to both the main scanning direction and the sub-scanning direction, respectively; and

an eccentric amount adjustment unit that  
5 respectively adjusts eccentric amounts of the eccentric members, wherein

outer surfaces of each of the eccentric members make a contact with the both ends of the scanning lens, respectively, and

both ends of the scanning lens are displaced in a  
10 sub-scanning direction based on the eccentric amounts that change with a rotation of the eccentric members; and

N image carriers on each of which a latent image is formed, wherein

the optical scanner has N optical paths so that the latent image  
15 is formed on each of the N image carriers through the N optical paths, and

the adjustment member is disposed on each of N-1 optical paths among the N optical paths.

20 15. A color image forming apparatus comprising:

an optical scanner including

a scanning lens that is disposed in a main scanning direction as a longitudinal direction, and that transmits light from a light source;

25 a scanning lens holding member that holds the scanning

lens so that the scanning lens is movable in a sub-scanning direction;  
and

an adjustment unit that is disposed on each of  
longitudinal ends of the scanning lens, and that displaces the  
5 longitudinal ends in the sub-scanning direction, wherein the adjustment  
unit is provided with an actuator that is driven electrically; and

N image carriers on each of which a latent image is formed,  
wherein

the optical scanner has N optical paths so that the latent image  
10 is formed on each of the N image carriers through the N optical paths,  
and

the adjustment member is disposed on each of N-1 optical paths  
among the N optical paths.

15 16. A color image forming apparatus comprising:

N optical scanners, each of the optical scanners including  
a scanning lens having a curved surface centering  
around an optical axis;

a scanning lens holding member that holds the scanning  
20 lens, having a receiving surface that supports the curved surface; and  
an adjustment member that rotates the scanning lens,  
with the optical axis as a rotating center, to adjust a position of the  
scanning lens; and

N image carriers on each of which a latent image is formed,  
25 wherein

the optical scanner has a single optical path,  
the latent image is formed on each of the N image carriers via  
the N optical scanners, and  
the adjustment member is disposed on each of N-1 optical  
5 scanners.

17. A color image forming apparatus comprising:  
N optical scanners, each of the optical scanners including  
a scanning lens that is disposed in a main scanning  
10 direction as a longitudinal direction, and that transmits light from a light  
source;  
a scanning lens holding member that holds the scanning  
lens so that the scanning lens is movable in a sub-scanning direction;  
and  
15 an adjustment unit including  
two eccentric members that are disposed on both  
ends of the scanning lens, and rotate centering around each of  
supporting axes that are perpendicular to both the main scanning  
direction and the sub-scanning direction, respectively; and  
20 an eccentric amount adjustment unit that  
respectively adjusts eccentric amounts of the eccentric members,  
wherein  
outer surfaces of each of the eccentric members make a  
contact with the both ends of the scanning lens, respectively, and  
25 both ends of the scanning lens are displaced in a

sub-scanning direction based on the eccentric amounts that change with a rotation of the eccentric members; and

N image carriers on each of which a latent image is formed, wherein

5 the optical scanner has a single optical path,

the latent image is formed on each of the N image carriers via the N optical scanners, and

the adjustment member is disposed on each of N-1 optical scanners.

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18. A color image forming apparatus comprising:

N optical scanners, each of the optical scanners including

a scanning lens that is disposed in a main scanning direction as a longitudinal direction, and that transmits light from a light source;

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a scanning lens holding member that holds the scanning lens so that the scanning lens is movable in a sub-scanning direction; and

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an adjustment unit that is disposed on each of longitudinal ends of the scanning lens, and that displaces the longitudinal ends in the sub-scanning direction, wherein the adjustment unit is provided with an actuator that is driven electrically; and

N image carriers on each of which a latent image is formed, wherein

25 the optical scanner has a single optical path,



the latent image is formed on each of the N image carriers via the N optical scanners, and

the adjustment member is disposed on each of N-1 optical scanners.

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19. An image forming apparatus comprising:

an optical scanner including

a scanning lens that is disposed in a main scanning direction as a longitudinal direction, and that transmits light from a light source;

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a scanning lens holding member that holds the scanning lens so that the scanning lens is movable in a sub-scanning direction; and

an adjustment unit that is disposed on each of longitudinal ends of the scanning lens, and that displaces the longitudinal ends in the sub-scanning direction, wherein the adjustment unit is provided with an actuator that is driven electrically;

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a plurality of sensors that is disposed in the main scanning direction with a predetermined interval to read a position of an image formed on an image carrier; and

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a compensating unit that compensates misalignment of the image in the sub-scanning direction by driving the actuator based on information on the position of the image read.

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20. An image forming apparatus comprising:  
a plurality of optical scanning systems that employs a scanning lens including a curved surface and having a specific adjusting axis, wherein
- 5 the specific adjusting axis is a rotating center of the scanning lens and center of the curved surface,  
the scanning lens is disposed on a holding member in such a manner that the curved surface is in contact with a receiving surface of the holding member, and
- 10 a position of the scanning lens is adjusted by a rotating mechanism that rotates the scanning lens.